PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Power Transmitting Devices.

I, HAROLD GEORGE CRUIKSHANK FAIRWEATHER, of 65 and 66, Chancery Lane, London, W.C. 2, and 29, Saint Vincent Place, Glasgow, Chartered Patent Agent, of British nationality, do hereby declare the nature of this invention (a communication from Pitt Railway Equipments Limited, of 17, St. John Street, Montreal, Quebec, Canada, a Canadian company) and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to new and useful improvements in power transmitting devices, and is particularly adaptable for running electric generators for supplying electricity to steam railway passenger cars or the like, and the object of the invention is to provide a simple, economical and efficient device which will insure the rotation of the driven machine continually in the one direction independently of the change of direction in the rotation of the driving member.

More particularly the invention relates to improvements in power transmitting devices of the kind described in our prior Patent No. 194,992.

In my invention, I provide a driving member having helical teeth adapted to engage with helical toothed pinions slidably mounted on and keyed to an intermediate shaft, which is provided with a raised portion between the pinions to limit the travel of same. The pinions are provided with clutches adapted to engage with clutches formed in bevel wheels, rotatably mounted on the intermediate shaft and adapted to engage with a crown bevel wheel, mounted on a shaft driving a generator. The pinions are so formed that only one of the bevel wheels mounted on the intermediate shaft drives the generator. The driving member is mounted on split sleeves which are keyed to the axle of the car by means of tapered wedges held in position by collars:—

[*Price* 1/-]

In the accompanying drawings:—

Fig. 1 is a plan view of the transmission device shown partly in section.

Fig. 2 is a longitudinal sectional view of the casing partially closed in at the end, showing the driving member in elevation and one set of the spiral bevel wheels.

Fig. 3 is a cross sectional view of the transmission showing the bevel gears.

Fig. 4 is a plan view of the driving member.

Fig. 5 is an end view of the driving member mounting or sleeve.

Referring more particularly to the drawings, 11 designates an intermediate shaft having a central annular flange 12 forming a gear stop and reduced journal ends 13 and 14. The journal ends are supported in the walls of the bowl 15 of the casing and more particularly in the bearings 16.

The front of the bowl 15 is closed in by a head plate 17, which is suitably curved and shaped for the enclosed gearing and is rigidly secured to said bowl by the bolts 18 passing through the flanges 19 and 20 of said head plate and bowl respectively. The cover 21 of the casing is joined to said head by the bolts 22 passing through the flanges 19 and 23 of said head and cover respectively. An opening 24 is formed in the cover 21 for lubricating and inspection purposes, and a plate 25 is provided to cover said opening.

The cover tapers to the tail end 26 of the casing and is joined to the bowl 15 by the bolts 27 passing through the flanges 28 and 29 from the lower and upper ends of said cover and bowl respectively.

The bowl 15 is dipped at 30 at the beginning of the body portion 31 to form a receptacle for the lubricating substance, and is further held to the cover by the bolts 32 passing through the cover and the bowl.

The longitudinal bearing 33 extends the full length of the tail portion 26 and the latter is closed in by the cap 34, hav-

ing a shaft orifice for the transmission shaft 35 journalled in the bearing 33 and carrying at its upper end the spiral bevel gear 36 and at its outer end driving the machine 37 through the universal joint 38. The clutch members 39 and 40 are mounted in fixed positions within the body portion 31 of the casing and on the shaft 11, and practically constitute enlargements of said shaft just inside the journal bearings 16 and are formed with the teeth 41 and 42 on their inner sides of similar formation and having slanting backs 43 to permit of the rotation of the co-acting member in a contrary direction.

The spiral bevel gears 44 and 45 are fixedly mounted on the clutch members 40 and 41 and are in constant engagement with the bevel gear 36, consequently on driving one or other of the bevel gears 44 or 45, the transmission shaft will be driven and, no matter which one is doing the driving, there will be no change whatsoever in the direction of rotation of said transmission shaft.

The pinions 46 and 47 are rigid with or form part of the clutch members 48 and 49 respectively and are spiral or formed with their teeth at an angle to their axes, and slidably mounted on the shaft in the keyways 50 and 51 respectively. These pinions 46 and 47 are permanently separated by the annular flange 12 forming on each of its sides a gear stop, in order to maintain each of said pinions to its respective side and within operative distance of its co-acting clutch member.

The driving gear 52 is formed with its teeth at an angle to its axes and is adapted to engage with the pinions 46 and 47 constantly and, because of the spiral formation of both gear and pinions, the latter will be driven in one direction during the rotation of the axle in one direction and in the other direction during the opposite direction of rotation of said axle.

It will be seen, however, that the stop 12 always bars further sliding movement of one pinion, while the other pinion moves its coacting clutch member, with the result that the bevel pinion is driven and communicates its motion through the transmission shaft bevel pinion to said transmission shaft and driven machine and, meanwhile, the other pinion and opposite bevel wheel are revolving idly, until the direction of rotation of the axle changes when they come in to active work in place of the other.

To provide an easy means for mounting the driving gear 52 on standard axles without dismantling same, split sleeves 53 and 53ª are mounted on the axle 54. The outer ends of the sleeves are held together by means of the split collars 55, which are provided with attaching bolts 56. Between the collars and the axle tapered keys 57 are provided, said keys being adapted to fit into key seats cut in the collar. The keys are wedge-shaped and taper towards the outside faces 58 of the collars, which are also provided with studs or bolts 59 passing through the collars and into the ends of the sleeves. The inside ends of the sleeves are provided with butting flanges 60 and 61, to which the web 62 of the wheel 52 is bolted by means of the bolts 63, passing through said web and both of the sleeves may be arranged so that flanges. The joints between the halves they do not align with one another and the joint between the halves of the wheel may be arranged to be spaced from the joints in the sleeves. The sleeves are provided with ridges 64, which are adapted to fit into circular recessed portions 65, formed in the bearing bushes 66, which are mounted in the bearings 67 formed in the casing. The above construction of sleeves is for attaching the device to an existing railway car, but it will be readily understood that the sleeve and driving gear may be cast together and the sleeve mounted on the axle, or any such modification may be made in the construction of the device when mounting the device on new railway equipment. The casing in the head and body portion in the vicinity of the driving gear may be provided with cavities 68, which offer temporary receptacles for the lubricating oil that would otherwise travel as rapidly as the wheel and gain such force as would penetrate almost any packing. These cavities form interruptions and the oil therefrom flows back quietly to the bowl through the channels to be again picked up by the rotating wheels.

Various modifications may be made in the construction without departing from the spirit of the invention.

In the operation of this invention, in particular reference to the lighting of steam railway cars, the rotation of the car axle turns the main driving gear and this gear is wide enough across the toothed face to include always the two pinions in the meshing of the teeth.

The pinions are consequently always rotating during the rotation of the axle and the angle of the teeth in both pinions and driving gear insures the movement of one pinion into clutch with a bevel gear and the movement of the other against the central stop on the interme-

diate shaft. The reverse direction of rotations reverses the position of these pinions, thereby driving one bevel gear for the one direction of rotation of the axle and the other bevel gear for the other direction of axle rotation and, as these bevels oppose one another and are both constantly in engagement with the bevel on the transmission shaft, the latter will always turn in the one direction, no matter which way the axle turns, and naturally the dynamo will be driven without interruption while the axle revolves and eliminate the necessity of a pole changer and its attendant troubles.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a power transmitting device, a transmission shaft, a main shaft and an intermediate shaft parallel with the main shaft, a main driving gear having its teeth formed at an angle to the axis, pinions slidably mounted on and keyed to said intermediate shaft and having their teeth formed at an angle to their axis and coacting with said main gear and separated by a central stop, opposing gears mounted on said intermediate shaft and adapted to clutch with said pinions respectively, and a gear constantly engaged by said opposing gears and mounted on said transmission shaft.

2. In a power transmitting device, a transmission shaft, and a main shaft and intermediate shaft, traversely arranged in relation to said transmission shaft, a main gear, pinions slidably keyed to said intermediate shaft and moved by said inner gear, a stop between said pinions, opposing gears respectively engaged by said pinions, and a transmission gear constantly engaged by said opposing gears.

3. In a power transmitting device, a main shaft suitably journalled and driven, a casing carried thereby, a main gear having teeth angular to its axis fixedly mounted on said shaft, an intermediate shaft journalled in said casing and parallel to said main shaft and having a central collar forming a pinion stop, a pinion meshing with said main gear and slidably mounted on and keyed to said intermediate shaft on one side of said stop and forming a clutch member, a pinion meshing with said main gear and similarly mounted on the other side of said stop and forming a clutch member, opposing gears having hubs forming the co-operating clutch members and in turn driven by a pinion aforesaid, a transmission shaft journalled in said casing at right angles to said main shaft, and a transmission gear in constant engagement with said opposing gears.

4. A power transmitting device, including in combination with the parts recited in Claims 1 and 2 a car axle forming the main shaft and driven by supporting wheels, a casing having a bowl forming a lubricant well, a cover reaching down to said well and forming bearings in a lower horizontal plane than said axle and a head closing in said cover and bowl and a part of said axle extending therethrough.

5. A power transmitting device, as claimed in Claim 4 wherein the casing has oil cavities and channels adjoining the gear chamber.

6. In a power transmitting device, a car axle forming part of the running gear and the main shaft of the drive, a casing enclosing the gears and part of the axle, a main gear having teeth at an angle to its axis and rigid with a sleeve mounted on the axle, wedge-shaped keys between the sleeve and the axle, collars secured to the sleeve to hold the keys in position, an intermediate shaft journalled in said casing and parallel to said main shaft and having a central collar forming a pinion stop, a pinion meshing with said main gear and slidably mounted on and keyed to said intermediate shaft on one side of said stop and forming a clutch member, a pinion meshing with said gear and similarly mounted on the other side of said stop and forming a clutch member, opposing spiral gears having hubs forming the co-operating clutch members and in turn driven by a pinion aforesaid, a transmission shaft journalled in said casing at right angles to said main shaft, and a transmission gear in constant engagement with said opposing gears.

7. A power transmitting device according to Claim 6 having the sleeve, main gear and collar split and suitably bolted together for easy erection on the main axle.

8. In a power transmitting device, the combination and arrangement of parts, substantially as described and shown in the annexed drawings.

Dated this 28th day of April, 1924.

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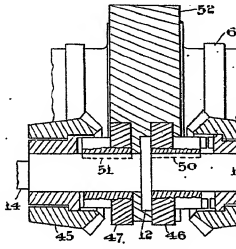
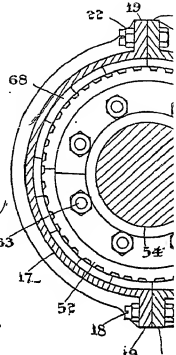


FIG.3



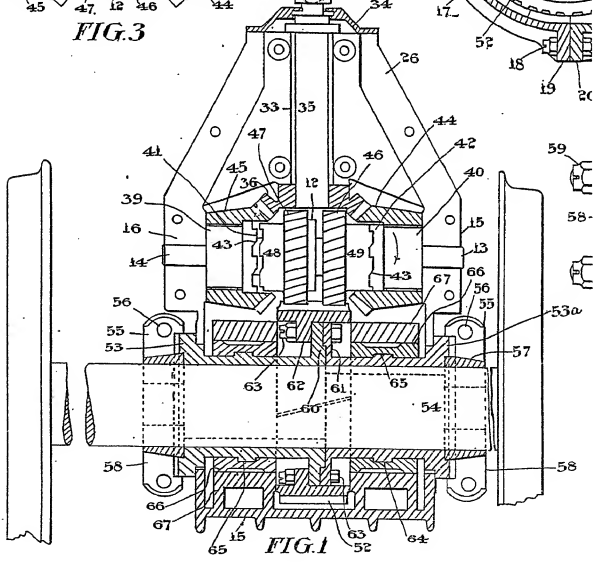


FIG.1

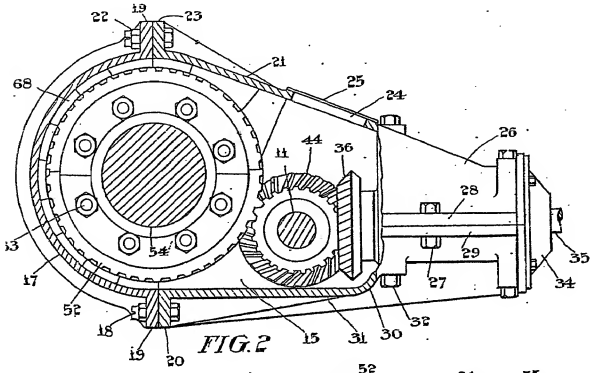


FIG. 2

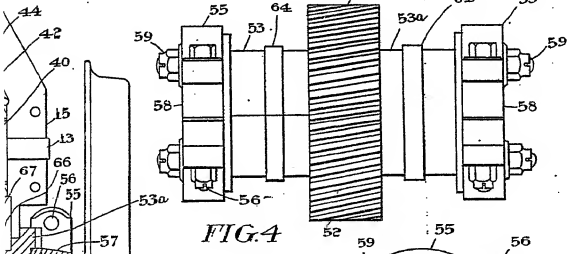


FIG. 4

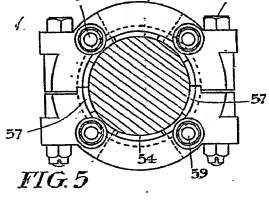


FIG. 5

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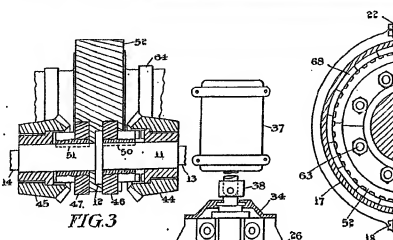

FIG.3

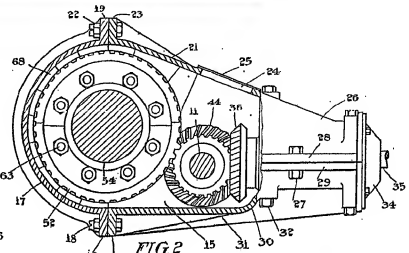

FIG.2

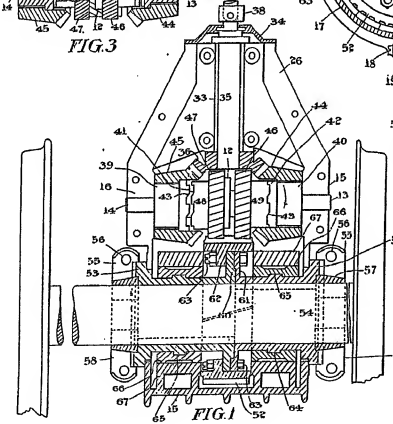

FIG.1

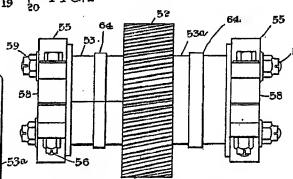

FIG.4

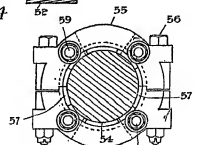

FIG.5

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